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TITLE: Resin granule for washing, method for producing the same, and method for washing resin molder using the same

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One of the novel characteristics of the resin granule of the present invention is that the detergent component is present essentially in the coating layer over the external surface of each particle of the resin granule. Thickness of the coating layer of the detergent component is 100. μ m. or less, preferably 1 m. μ m. to 100. μ m., more preferably 2 m. μ m. to 70. μ m., most preferably 5 m. μ m. to 30. μ m. for securing sufficient washing effect. When thickness of the coating layer of the detergent component is below 1 m. μ m., the detergent cannot fully exhibit its inherent effect for washing a molder when the type of resin it molds is to be changed, as illustrated by COMPARATIVE EXAMPLES, later described. When the thickness of the coating layer is above 100 . μ m, on the other hand, other types of problems may occur; e.g., the washing effect may no longer increase in proportion to quantity of the detergent component used, and there may be increased difficulty in handling the detergent because of its increased adhesion. Thickness of the coating layer can be determined by the elliptical polarization method ("Surface Measurement Techniques and Their Applications," pp. 102, published by Kyoritu Shuppan).

1 A polyethylene resin granule for washing molders or the like, wherein the external surface of each particle of the granule is coated with a detergent component to a thickness of 10 m. μ m. to 30. μ m.,

2 a polyethylene resin granule for washing molders or the like, wherein the external surface of each particle of the granule is coated with a detergent component and a third component to a thickness of 15 m. μ m. to 50. μ m.,

3 a polypropylene resin granule for washing molders or the like, wherein the external surface of each particle of the granule is coated with a detergent component to a thickness of 10 m. μ m. to 30. μ m.,

4 a polypropylene resin granule for washing molders or the like, wherein the external surface of each particle of the granule is coated with a detergent

component and a third component to a thickness of 15 m.mu. to 50.mu.,

5 a method for producing a resin granule for washing molders or the like, wherein the resin granule is immersed in a solution of a detergent component for a sufficient time so that a 1 m.mu. to 100.mu. thick coating layer is formed over the particles of the resin granule, and the resin particles coated with the detergent component are dried, and

5.0 kg of a high-density polyethylene granule having an average size of 2.5 mm (averaged longest dimensions) was immersed in silicone oil (SP: 7.3, Toshiba Silicone, TSF451-100) as the detergent component at normal temperature for 3 min. The granule coated with the detergent component was withdrawn from the oil and dried at 30.degree. C. for 1 h, to prepare Detergent A. Thickness of the coating layer of the detergent component over Detergent A was 1.mu.. The detergent particles having a size of 4.5 mm or more accounted for 4% of the total particles.

5.0 kg of a high-density polyethylene granule having an average size of 3.5 mm was immersed in liquid paraffin (SP: 8.0) as the detergent component at normal temperature for 5 min. The granule coated with the detergent component was withdrawn and dried at 30.degree. C. for 1 h, to prepare Detergent B. Thickness of the coating layer of the detergent component over Detergent B was 30.mu.. The detergent particles having a size of 5 mm or more accounted for 4% of the total particles.

5.0 kg of a high-density polyethylene granule having an average size of 1.5 mm was immersed in a fluorine-based surfactant (SP: 6.1, Dai-Nippon Ink, F-177) as the detergent component at normal temperature for 3 min. The granule coated with the detergent component was withdrawn and dried at 35.degree. C. for 1 h, to prepare Detergent C. Thickness of the coating layer of the detergent component over Detergent C was 0.3.mu.. The detergent particles having a size of 2.5 mm or more accounted for 3% of the total particles.

5.0 kg of a high-density polyethylene granule having an average size of 3.0 mm was immersed in a paraffin-based process oil (SP: 6.6, Mitubishi Oil, P-4) as the detergent component at normal temperature for 10 min. The granule coated with the detergent component was withdrawn and dried at 30.degree. C. for 1 h, to prepare Detergent D. The thickness of the coating layer of the detergent component over Detergent D was 80.mu.. The detergent particles having a size of 4.0 mm or more accounted for 3% of the total particles.

5.0 kg of a polypropylene granule having an average size of 2.0 mm was

immersed

in a fluorine-based surfactant (SP: 6.1) as the detergent component at normal temperature for 5 min. The granule coated with the detergent component was withdrawn and dried at 35.degree. C. for 1 h, to prepare Detergent E. Thickness of the coating layer of the detergent component over Detergent E was 0.2.mu.. The detergent particles having a size of 3 mm or more accounted for 4% of the total particles.

5.0 kg of a high-density polyethylene granule having an average size of 2.5 mm was immersed in silicone oil (SP: 7.3, Toshiba Silicone, TSF451-100) as the detergent component at normal temperature for 2 h. Thickness of the coating layer of the detergent component was 1 .mu.m. The detergent particles having a size of 4.5 mm or more accounted for 4% of the total particles.

5.0 kg of a high-density polyethylene granule having an average size of 5.0 mm was immersed in tri(2-ethylhexyl) phosphate (TOP, SP: 7.9) as the detergent component at normal temperature for 10 min. The granule coated with the detergent component was withdrawn and dried at 35.degree. C. for 1 h, to prepare Detergent (b). Thickness of the coating layer of the detergent component over Detergent (b) was 120.mu.. The detergent particles having a size of 5.5 mm or more accounted for 7% of the total particles.

It is apparent, as illustrated by EXAMPLES and COMPARATIVE EXAMPLES, that a notable washing effect is secured by the resin granule with a detergent component thereon in a film of specific thickness, in particular as a coating layer.

1. A resin granule for washing, comprising a resin granule and a detergent component, wherein the external surface of each particle of said granule is coated with a layer of the detergent component to a thickness of 0.1.mu. to 100.mu..

2. The resin granule for washing of claim 1, wherein the thickness of the coating layer of said detergent is 0.2.mu. to 70.mu..

6. A method for producing a resin granule, for washing, comprising a resin granule and a detergent component, wherein said resin granule is brought into contact with said detergent component for a sufficient time so that the external surface of the former is coated with a layer of the latter to a thickness of 0.1.mu. to 100.mu., by at least one of the process selected from the group consisting of: